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ABSTRACT

In response to a request from the New Mexico legislature, this report assesses the feasibility of establishing technical high schools in the state. The first part of the report relates the current need for technical education to the nation's and the state's rapidly changing technological base. In part two the author addresses the difficulties New Mexico's public schools now have in providing technical education, including needs for additional facilities, up-to-date equipment, basic supplies, and vocational teachers with modern skills. Five ways to provide technical education are then discussed, encompassing vocational programs in conventional high schools, centralized programs within districts with more than one high school, separate technical high schools, cooperative vocational programs among small school districts, and area vocational schools such as are described for Lea and San Juan counties. Among the report's findings are that technical education can be expanded in New Mexico and that this will require commitments from local school boards. The report recommends the expansion of technical education programs in secondary schools, the encouragement of area vocational schools, and interdistrict cooperation to establish technical education programs. (Author/RW)

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TECHNICAL EDUCATION
IN NEW MEXICO HIGH SCHOOLS

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Report of the Legislative Education Study Committee
to the Thirty-Fifth Legislature, First Session, in response to
House Floor Substitute for House Joint Memorial 13
of the Thirty-Fourth Legislature, First Session

EA 014 013

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INTRODUCTION

This study contains the response of the Legislative Education Study Committee to HFS/House Memorial 13 (1979) which called for a study of the feasibility of establishing technical high schools in New Mexico. The need for education in the technical areas is described in the memorial in the following way:

> "....our country's problems are becoming extremely complex and require greater expertness in their solution. America's continued reliance on science and technology will be manageable only if the people are willing to commit themselves to securing greater expertness through quality career-oriented technical education."

To determine how these needs could best be met in New Mexico, various technical education programs were visited. Among these were three programs in Southern California which are considered among the nation's best such programs. Various types of programs within New Mexico were visited and studied as well. National literature in the area of technical education was reviewed, and the expertise of vocational and technical educators on the state and local levels was used.

The first part of the study discusses the need for technical education from both a national and local perspective. The second part details problems faced by New Mexico schools in providing technical education. The third part describes different ways in which technical education could be provided, and the last section lists the findings and recommendations of the study.

THE NEED FOR TECHNICAL EDUCATION

The educational needs of society are not constant. As society itself changes, the role to be played by the educational system in preparing individuals to be able to contribute to the society also changes. The schools should respond to these changes, and should at any given time reflect the conditions present in the communities in which they function.

Once this general statement of philosophy has been made, however, it becomes clear that the schools are imperfect reflectors of their communities and society. This is certainly understandable, but the goal to be expected of the schools remains that each student receive an education which will enable him to become a productive and contributing member of his community. The role of the schools is, therefore, a remarkably rich and complex one. Even a brief consideration of the needs of society and of the roles available for individuals in society will reveal the immensity of the school's task. Society needs professional people such as doctors, lawyers, teachers, engineers, medical researchers, planners, chemists, oceanographers, psychologists, and librarians. Society needs business people such as contractors, farmers, managers, accountants, retailers, salesmen, and brokers. Society also needs skilled trades people such as carpenters, auto mechanics, plumbers, beauticians, sheet metal workers, secretaries, electricians, heavy equipment operators, electronic technicians, dental hygienists, and printers. Even this brief consideration of the diversity of the needs of society reveals the staggering task of the educational system.

The educational system has traditionally provided most individuals with a broad, general, and hopefully comprehensive education through the secondary level. Along with this general education the schools have long attempted to prepare individuals for some form of gainful employment. In the past, however, many people received the actual training necessary to perform in a particular job through experiences received outside the public school system. Many people traditionally served as an apprentice to a tradesman in order to learn the skills of the craft,

or learned these skills through on-th-job training. Students whose interests were in professional fields tended to receive their education in those fields in colleges or universities, usually after completing more coursework in general academic areas.

In spite of the emphasis of the public schools toward general academic education, high schools have offered some preparation in the vocational areas. Some students have always been disinterested in the traditional academic program of the high school, and the schools have offered something of an alternative to these students. This traditional vocational education was, however, similar to the academic program in that it was not usually designed to actually teach the job skills necessary in a particular career area. Just as the traditional academic program served as an introduction to further advanced study in a subject area, so also did the traditional vocational education serve as an introduction to the type of skills necessary to hold a job in a skill area. Traditional vocational subjects at the secondary level included such areas as wood shop, metal shop, and home economics. These courses developed certain basic manual skills, with the assumption being that students would learn the actual skills required for a particular job somewhere else.

Vocational education, as practiced today in New Mexico, has changed a great deal from the situation described. The reason for the changes that have occured in vocational education is simply in order to more adequately reflect the needs of the society for the education of young people. Since society constantly changes, the educational system must constantly change along with it. In recent years, the changes in society of particular importance to the public schools have been the increase in complexity and the resultant need for specialization. A brief examination of this change will show the direction in which the schools have needed to change as well.

The United States is becoming an increasingly technical society. More and more areas of society have developed a reliance on technology, including many areas which were traditionally not technical in nature. An example of this change can be seen in the growth of electronics over the

past several decades. In past years, electronics was a relatively limited field which included a few consumer products such as televisions and applications in a number of scientific fields. Now, however, scarcely any segment of society is not directly affected by electronics in some way. Consumer products are more and more frequently electronically controlled, often with sophisticated microprocessor circuits. Computer technology has drastically changed the use of information in fields as diverse as agriculture and academics. As the availability of this technology has increased so has the dependence of society on its use.

It is easy to think of the growth of technology as being a phenomenon removed from more human considerations. However, the growth of technology is not simply a growth in machines. Along with the vast increases in availability and application of technology has risen the capabilities and productivity of people. After all, technology remains the result of creative efforts by highly skilled individuals. Technology has changed the way people do things by expanding the capabilities of each person. Once again, however, this increase in human capacity has come with the increasing dependence of all of society on the new technology. Each new machine is, after all, designed to be used by a person. The need for the skilled individuals needed to make the best possible use of new technology has increased at a rate similar to the increase in technology itself.

The type of education needed to prepare an individual for a career in a field that has experienced technological growth is somewhat different than the type of education that has been traditionally provided. It is no longer sufficient to receive a basic, general form of education because the skills necessary to perform in a job have become increasingly more sophisticated. Traditional vocational education, with its emphasis on manual skill development, is also ill-suited to prepare students for actual job situations. Two examples of these changes will demonstrate the new challenges faced by the educational system.

The public schools have long taught typing as a vocational skill at the secondary level. The skill of typing has been a very important and valuable one for students to have, and students who master this skill have

traditionally been able to receive employment in which the skill is used. Most offices had typewriters, and generally every typewriter was the same as every other typewriter. The other skills necessary to be a secretary, such as answering the telephone, could be learned on the job. Offices today, however, are very different places than the ones of even the recent past. Typewriters have become word processors which require specific training, often with the exact make and model of machine, in order that the full effectiveness of the machine can be realized. Telephones have become, in many offices, complex devises for the transmission of information, including computer data as well as voice communication. Larger offices have telephone systems which require an operator skilled in the operation of that particular system. The office trades have become highly technical in nature, and the training needs for individuals in these areas have changed along with them. (Technological change can also reduce training needs. Shorthand has become a virtually obsolete skill as the development of dictation equipment has taken place.)

In another example of how the growth of technology has affected educational needs, automobile mechanics has undergone similar changes. Anyone who has attempted to repair their own car in recent years will attest to the fact that the technology of the automobile has undergone dramatic changes. Cars today include many electronic circuits which can control ignition, fuel mixture, and instrumentation. Some cars have turbochargers which imbody a highly sophisticated and complex technology. Society's need for fuel efficient and pollution free cars, along with the development of new technology, has resulted in automobiles with tremendous increases in complexity over past years. Auto repair shops now look akin to a electronics test laboratories, with the specialized equipment now necessary to diagnose and repair failures in the various systems. Along with these changes have changed the needs for the education of individuals to actually use the machines and perform the work necessary to repair and maintain automobiles today.

The net result of these changes in society that have affected the educational needs of people is that the type of education needed has changed. Individuals are now needed who are skilled in specific technical areas. Specialization

has increased, as has the complexity of the various fields. More and more of the skills necessary are too advanced to be learned in the traditional on-the-job training. Finally, as the availability of advanced technology increases, the number of people needed to operate the technology increases as well. Simply put, the trend is for more and more people to receive employment in an area that requires some type of technical training.

One final aspect of the growth of technology should be mentioned. Just as the development and application of technology has changes the way things are done in fields such as office trades and automobile mechanics, so also has a new industry developed around the technology itself. New Mexico has been particularly affected by the growth in the technical fields. The educational needs of people in these areas differs considerably from the types of education traditionally offered by the educational system. These people need education of a technical nature which includes both the development of the understanding necessary to be able to contribute to the development of the technology, and the development of the skills in the technical area necessary to be able to use the technology. The educational needs of these people are not generally met by the colleges and universities because the needs are more specific than the general type of academic education they provide. Likewise, these individuals need more than the traditional vocational education with its emphasis on development of specific skills. What is needed, therefore, is technical education.

PROBLEMS IN PROVIDING TECHNICAL EDUCATION

The public schools of New Mexico have found vocational education, particularly in the technical fields, to be increasingly difficult to provide. The reasons for this difficulty are many, but most center around the increasing complexity and specialization of all vocational fields. It is important to note that this specialization is a function of the changes that have occured in society, particularly industry, because of the development of new forms of technology. The role of vocational education has been in the past, and remains so in the present, to meet the educational training needs for individuals to receive gainful and productive employment. To this end, the educational system must respond to the new demands with changes in the instructional program to reflect the actual conditions present for employment.

The demands on the public schools of New Mexico in the vocational and technical areas can be classified into three basic areas: facilities, equipment and supplies, and personnel.

Facilities

As has been discussed, one of the primary effects of the expansion of technology has been an increase in the specialization of the various technical fields. Whereas before the basic office skill was typing, the skills now called for include word processing, communications, and even data processing. All these skills require equipment of a specialized nature. What this means to the schools is that more space is necessary to house the additional equipment and programs necessary to prepare individuals adequately. Automobile shops were formerly small garages with a pit in the floor and a large tool box. Automobile shops today house large sophisticated equipment for alignment, tuneups, brakes, tires, and the myriad of other systems which make up today's automobiles. All this equipment requires room, and schools which wish to prepare students to use the equipment must also find room to house it. Finally, the increase in specialization has created the need for more and more specific training to meet the educational needs of each of the specific skills areas. This

specialization dictates additional programs, because the more general skills of the past are no longer sufficient. Additional programs require additional space.

Equipment and Supplies

As the increase in the specialization of the vocational and technical areas has dictated the expansion of facilities to house programs to teach the skills, so also has this specialization created needs for additional equipment. The expansion of technology has resulted in many more machines and devises designed for particular purposes. Offices have word processors and computers. Auto shops have diagnostic and tune-up equipment. Welding shops have the traditional oxy-acetyline and arc welders, but welders must now also be proficient in the use of more advanced equipment such as TIG welders. Virtually every field has experienced a similar growth in the amount and sophistication of the equipment used in the field. This equipment is usually expensive, but because of the increases in productivity that it makes possible such equipment has become standard in industry. If the purpose of vocational education is to prepare people for employment in industry, then the vocational schools must prepare people to use this equipment. A further complication in this area is the fact that, just as the rapid expansion of technology has rendered such equipment possible, so also does further technical development often render such equipment obsolete. This is exactly the situation in New Mexico schools where students are taught on obsolete and out-of-date equipment that will often not be found in actual work places. Similarly, the supplies necessary to operate this equipment have also become more sophisticated. In order to learn how the equipment is used it is usually necessary to actually operate the equipment. The schools have found the prices for such supplies as welding rod and paper rising at rates often far in excess of the general rate of inflation.

Personnel

Perhaps the most important need of the schools is for the people to teach these skills to young people. Vocational teachers have often been people

who, for reasons ranging from a desire to work with young people to a preference for the working conditions of the schools, have been willing to teach even though they could possible receive more money by working in the field of their expertise. This situation has not changed, however the availability of people with the skills in the new technical field is often short. Schools face a difficult time in recruiting teachers in these fields simply because of variety of technical fields now in existance. Once again, the increasing specialization of the technical areas presents a problem to the schools.

Although the difficulties in providing education in the ever-expanding technical areas are great, the situation is certainly not hopeless. Some of the ways in which these educational needs can be met, including methods now in use in New Mexico will be discussed in the next section.

WAYS TO PROVIDE TECHNICAL EDUCATION

The expansion of the technical areas has presented problems to the public schools of New Mexico. Since technology will contine to expand, and since more and more of society will be influenced in some way by this expansion, how the schools respond to these problems will in no small way help to determine how effective the public schools will be in the future.

The public schools of New Mexico have several options open to them that may provide at least part of the answer to the challenges presented by the expansion in technology. Schools must examine their programs in light of these options and determine which course of action is most appropriate with their students. Some of these options are presented below. Also presented are the options that have already been chosen by the schools in several New Mexico communities.

Conventional High School

As in the past, most vocational education in New Mexico schools, including education in the technical areas, is provided to high school students at their own high school as part of the school's comprehensive program. Such programs can be very successful. Many schools in communities with a large agricultural industry have offered excellent preparation for careers in agriculture. These programs are found in small high schools as well as some of the larger schools of the state.

Not all programs can be provided as well in this traditional setting. Many of the communities in which strong vocational agriculture programs are found are predominantly agricultural in base, and many students are available for classes. Also, the resources for teaching are often readily available within the community. The expanding technical areas, on the other hand, are often so specialized that smaller schools cannot provide training in any but a handful of areas. Even many larger schools are hard-pressed to offer training in more than a few of the many areas in which employment is available and training is necessary.

However, many New Mexico high schools are able to offer vocational education, and even on occasion technical education, within the traditional high school setting. The Las Cruces schools offer their students courses in printing, with facilities housed in a vocational classroom at Mayfield High School. The Albuquerque Public Schools offer drafting in the high schools, with one program located at Del Norte High School. Similar examples of specialized technical education programs can be found in other New Mexico schools, however, few schools are able to offer more than a few of these programs.

Centralized Programs

In school districts with more than one high school opportunities are available for the sharing of students between the schools with specialized programs located wherever facilities or staff are conveniently available. An example of this approach can be found in Roswell, where students from both Roswell High School and Goddard High School attend one program in Building Trades and another in Nursing Assistant. The advantage of such an arrangement is that by sharing students, a district can be able to offer a program in an area for which one school does not have enough student interest, with savings in salaries and equipment and facility costs.

A somewhat different approach to the sharing of students between high schools is practiced in Albuquerque. In Albuquerque, students may choose to enroll in various specialized programs, such as building trades and cosmetology, at the Career Development Center (CDC). This facility is housed in a separate building from other schools, and is operated as a separate program within the Albuquerque schools. Students are bused to the CDC from the high school in which they are enrolled, and return to their own school each day when their classes at the CDC conclude. This program, and the principle behind it, is not limited to vocational courses. In the technical area, the center offers classes in computer science which use the center's own computer. The high costs of purchasing and operating a computer are thereby minimized by allowing the maximum possible use of the computer by students. The center also offers courses in specialized academic areas as well, such as advanced biology and foreign languages.

This type of sharing of students has proven successful, and the Albuquerque schools plan to increase the size and scope of the Career Development Center. Under these plans, the CDC will develop more offerings in the vocational and technical areas and also provide centralized classes for vocational education to developmentally disabled students.

Technical High School

In large metropolitan areas of the United States, many school districts have established separate high schools for students in various vocational areas. These schools are often referred to as technical high schools. Technical high schools are not limited simply to vocational education, as shown by the example of New York City where technical high schools provide instruction in sciences and the fine arts for students with special proficiencies in these areas. The schools maintain separate facilities, and are in most ways indistinguishable from a conventional high school. Such schools offer most of the activities of a conventional school, such as sports, and students enroll in the school for their academic program as well as their vocational program.

There are no true technical high schools in the state of New Mexico. Perhaps the closest program to a technical high school in New Mexico is the Vocational High School of Santa Fe. This program is located in a separate building at the Santa Fe High School campus, and students enroll in the school to receive the majority of their classes. This school is maintained by the Santa Fe schools as an autonomous unit, and tends to maintain a separate identity within the district.

For a time, the establishment of a technical high school was considered in the Albuquerque school district. Albuquerque does have sufficient students to establish such a school, but the idea was ultimately rejected by the district. Among the reasons for the decision not to procede with the establishment of a technical high school in Albuquerque was the fear that such a program would contribute to the isolation of students. If students with interests in a vocational or technical area were forced to attend a school separate from other students to receive such an education, vocational students could very well be isolated from others and miss out

on the opportunity to meet and be friends with other students with different interests. This could also contribute to the stigmatization of vocational students as being somehow less capable than other students. On balance, the Albuquerque schools determined that their needs could best be met through other means, namely through expansion of the Career Development Center and vocational programs within the high schools.

Inter-district Cooperation

Considering the obvious economies of scale in vocational and technical education, namely the advantages provided by developing programs for the largest possible number of students, it could be possible for smaller school districts in New Mexico to institute cooperative programs in the vocational area. Under such programs, neighboring small districts would cooperate in the development and operation of specialized vocational or technical education programs in which neither district has sufficient interested students. Such programs could be very beneficial to students in small districts because they could receive instruction in areas heretofore reserved for students in large districts. The small schools could nullify some of the disadvantages inherent in their size. In several areas of the state small rural districts are located close enough to each other to make such arrangements practical. The possibilities of such cooperation should be studied further.

Area Vocational Schools

Another arrangement for the provision of more specialized vocational and technical education to high school students is the use of area vocational schools. Such arrangements are presently in use in several parts of the state. This method can be best examined by reviewing the two largest programs of this type in New Mexico, namely the programs in Lea and San Juan counties.

Lea County

The Lea County school districts of Eunice, Hobbs, Lovington, Tatum, and

Jal determined several years ago that expansion of their vocational education programs was needed. However, none of the districts, particularly the smaller ones, could justify or afford the spending necessary for new programs which would be very costly. The New Mexico Junior College at Hobbs had been designated an area vocational school and offered to provide the programs needed by the districts.

The area vocational high school program now offers courses in Auto Mechanics, Data Processing, Health Occupation, Metals, and Building Trades, with further expansion expected. The program served over 130 students last school year. The smaller school districts in particular benefit from this program. Tatum, for example, is able to send approximately one-fourth of their graduating students to the program. Costs are divided between the Junior College and the districts, with costs to the district being far lower than what such programs would cost to set up individually. The college benefits because they are able to utilize their facilities more efficiently and extensively. All concerned seem to feel that this program is of benefit to the children of Lea County.

San Juan County

A similar approach to the problems caused by the need for vocational education was implemented in the 1979-80 school year in San Juan County. There the school districts of Aztec, Bloomfield, Central, and Farmington have entered into an agreement with the San Juan Branch of New Mexico State University to allow their area vocational school to provide the needed programs. In its first year of operation, this program served 224 students in programs of Carpentry, Construction Trades, Plumbing, Auto Body, Auto Mechanics, Diesel Mechanics, Welding, Communications and Media, Secretarial, Health Occupations, and Electro-mechanical. This program differs from the Lea County program in that students attend regular classes along with adult students. However, funding is also divided between the college and the school districts, with districts paying to the college approximately one-half of the amount generated by each student. Although enrollment for the first year did not meet expectations, both the districts and the college are satisfied with the program and predict growth in enrollment.

This type of approach is not without complications. Some school districts in the state feel that the expansion of educational opportunities for their students made possible by such programs are not worth the supposed cost to the district. However, the area vocational schools are able to provide specialized education at a cost to the district far below that which the district would incur were it to institute the programs. The area schools usually charge only the amount received by the district for each student for the number of hours the student is in the program. However, some districts still feel that they would prefer to keep the money generated by the student and hire their own teacher to provide a program.

In addition, many New Mexico school districts are unable to benefit from this type of arrangement. Many districts do not have area vocational schools located close enough for their students to attend. In the case of Albuquerque, an area vocational school is located within the city, but due to its own high enrollment it is unable to offer programs to large numbers of high school students.

In spite of these problems with individual districts, the use of the area vocational schools in New Mexico by high school students appears to be an idea of potential benefit to the students of the state. The area schools have the facilities, equipment, and staff in place for the programs. The area school benefits from the program in that they can maximize the use of facilities that may very well be idle at exactly the same time that they can best be used by high school students. The public schools benefit because they can provide programs which would be impossible for individual districts to operate. Finally, the student benefits because he or she is able to receive training in a specialized vocational or technical area that would not be available otherwise.

FINDINGS AND RECOMMENDATIONS

This study of the feasibility of expanding technical education at the secondary level in the public schools of New Mexico has examined the problems faced by the schools in providing this type of education and some possible ways in which these problems can be solved or through which their impact can be lessened. In regards to technical education, the findings of the Committee are as follows:

1. Changes in society and in the economy of New Mexico can be reflected in the schools through expansion of technical education.

2. The expansion of technical education in the schools will require the committment of local boards of education and personnel.

3. Several New Mexico school districts are meeting the challenge of technical education through innovative programs and coordination of resources.

In order that the development of technical education in the public schools of New Mexico be continued and supported, the following recommendations are made:

1. Stimulate the establishment and expansion of technical education programs at the secondary level.

2. Consider the needs of secondary students in planning for all area vocational schools.

3. Encourage the use of area vocational schools to provide vocational and technical education to secondary students where feasible.

4. Encourage cooperation between neighboring school districts to establish and operate vocational and technical education programs.